Tall fermenter

$r_{inner} := 7$

$pi := 3.141592654$

$angle := \frac{pi}{6}$

$F := \frac{1}{\left(\frac{.016387}{3.7854}\right)}$ Conversion of cubic inches to gallons

$r_{pipe} := .5$

$F = 231$

$h(r) := \frac{r}{\tan(angle)} - \frac{r_{pipe}}{\tan(angle)}$

$h_{cone}(r) := \frac{r}{\tan(angle)}$

$V(r) := \frac{1}{3} \cdot pi \cdot r^2 \cdot \left(\frac{r}{\tan(angle)}\right) - \frac{1}{3} \cdot \frac{pi \cdot r_{pipe}^{3}}{\tan(angle)}$

Height of the cut cone.

$h(r_{inner}) = 11.258$

$height_{cylinder} := (r_{inner} \cdot 2) \cdot 2.35$

$height_{cylinder} = 32.9$

$V_{cylinder}(r) := pi \cdot r^2 \cdot height_{cylinder}$

Volume inside cone.

$\frac{V(r_{inner})}{F} = 2.692$

Height of the True Cone

$h_{cone}(r_{inner}) = 12.124$

Volume of the Cylinder

$\frac{V_{cylinder}(r_{inner})}{F} = 21.924$

Total Volume of the Inside Cone & Cylinder

$\frac{V(r_{inner}) + V_{cylinder}(r_{inner})}{F} = 24.617$

$s(r,h) := \sqrt{(r^2 + h^2)}$

$s(.5, h_{cone}(.5)) = 1$ Side of the cone that is missing from the bottom.

$s(r_{inner}, h_{cone}(r_{inner})) = 14$ Side length of the inside cone.

Length of the tubular sheets that comprise the main body of the Unitank

$len_{body}(r) := 2 \cdot pi \cdot r$

Inside: $len_{body}(r_{inner}) = 43.982$

Squat fermenter

$r_{inner} := 9$

$pi := 3.141592654$

$angle := \frac{pi}{6}$

$F := \frac{1}{\left(\frac{.016387}{3.7854}\right)}$ Conversion of cubic inches to gallons

$r_{pipe} := .5$

$F = 231$

$h(r) := \frac{r}{\tan(angle)} - \frac{r_{pipe}}{\tan(angle)}$

$h_{cone}(r) := \frac{r}{\tan(angle)}$

$V(r) := \frac{1}{3} \cdot pi \cdot r^2 \cdot \left(\frac{r}{\tan(angle)}\right) - \frac{1}{3} \cdot \frac{pi \cdot r_{pipe}^{3}}{\tan(angle)}$

Height of the cut cone.

$h(r_{inner}) = 14.722$

$height_{cylinder} := \frac{h(r_{inner})}{.866}$

$height_{cylinder} = 17$

$V_{cylinder}(r) := pi \cdot r^2 \cdot height_{cylinder}$

Volume inside cone.

$\frac{V(r_{inner})}{F} = 5.723$

Height of the True Cone

$h_{cone}(r_{inner}) = 15.588$

Volume of the Cylinder

$\frac{V_{cylinder}(r_{inner})}{F} = 18.728$

Total Volume of the Inside Cone & Cylinder

$\frac{V(r_{inner}) + V_{cylinder}(r_{inner})}{F} = 24.451$

$s(r,h) := \sqrt{(r^2 + h^2)}$

$s(.5, h_{cone}(.5)) = 1$ Side of the cone that is missing from the bottom.

$s(r_{inner}, h_{cone}(r_{inner})) = 18$ Side length of the inside cone.

Length of the tubular sheets that comprise the main body of the Unitank

$len_{body}(r) := 2 \cdot pi \cdot r$

Inside: $len_{body}(r_{inner}) = 56.549$

$$\frac{2.7}{2.7+21.9}\cdot 100 = 10.976$$

$$(15.8+5.7)\cdot .2 = 4.3$$

$$15.8-4.3 = 11.5$$

$$\frac{5.7}{11.5+5.7} = 0.331$$